CLAIMS

What is claimed:

1. A self lubricating, overhead conveyor system comprising:

   a. an overhead track comprising a central support and a plurality of flanges extending from the support;

   b. a plurality of trolley assemblies, each trolley assembly comprising a trolley bracket and a pair of trolley wheel assemblies removably secured to the bracket by a fastening means at a first point, with each trolley wheel assembly comprising a trolley wheel having a self-contained ball bearing assembly, the ball bearing assembly comprising a unitary inner race, a unitary outer race, a floor joining the inner race and the outer race to create a raceway, a plurality of balls situated in the raceway and a lubricating means encapsulating the balls and substantially filling the raceway, the fastening means coupling the trolley wheel assemblies to the bracket by contacting only the inner race of the ball bearing element;

   c. a conveyor chain comprising a plurality of links, with each link having a central cavity, the links joined together by a central member, the central member configured to engage the trolley bracket at a second point;

   d. a lubricating turn wheel assembly comprising a plurality of tooth segments engaging the conveyor chain, the turn wheel assembly providing constant lubrication to the conveyor chain; and

   e. a drive means to drive the conveyor system along the track.

2. The system of claim 1 where the trolley wheel further comprises a front side, a back side and a peripheral outer surface joining the front side and the back side, the front side having a chamber defined by a floor and a circular side wall. The chamber receiving the ball bearing assembly, the back side containing an aperture to receive the

fastening means, and the outer peripheral surface having an angle of 5-15 degrees as measured from the back side of the trolley wheel to the front side of the trolley wheel.

3. The system of claim 2 where the chamber is sealed by a cover, the cover having an aperture to receive the fastening means.

4. The system of claim 3 where the cover is sonically welded to the uppermost portion of the circular side wall of the

5. The system of claim 2 where the angle is 7 degrees.

6. The system of claim 1 where the trolley wheel is manufactured from a material selected from the group consisting of ultra-high molecular weight, polypropylene, polyethylene, Teflon and Delrin.

7. The system of claim 6 where the trolley wheel is manufactured from an acetyl homo-polymer of Delrin.

8. The system of claim 1 where the trolley wheel has a width of about 19 millimeters.

9. The system of claim 1 where the ball bearing assembly further comprises a groove in the raceway to guide the plurality of ball through the raceway.

10. The system of claim 1 where the ball bearing assembly further comprises at least one bearing cage, so that the balls do not contact one another.

11. The system of claim 1 where the balls are precision ground.

12. The system of claim 11 where the balls are manufactured from ABEC-1 stainless steel.

13. The system of claim 1 where the lubricating means is selected from the group consisting of graphite and a graphite phenolic resin.

14. The system of claim 13 where the lubricating means is a graphite phenolic resin, and the graphite phenolic resin is added to the ball bearing assembly in liquid form and heat cured to a solid form.

15. The system of claim 14 where the graphite material is heat cured at a temperature of from about 250 degrees Fahrenheit to about 650 degrees Fahrenheit for about two hours.

16. The system of claim 13 where the lubricating means provides a barrier against entry of contaminants into the ball bearing assembly.

17. The system of claim 13 where the rotation of the balls against the lubricating means constantly provides lubrication to the balls in the ball bearing assembly.

18. The system of claim 13 where the lubricating means virtually eliminates an inertia drag and reduces a coefficient of friction associated with the rotation of the balls in the raceway.

19. The system of claim 18 where the measured inertia drag of the trolley wheel assembly is about 0.001 Vs and the measured coefficient of friction is 0.26.

20. The system of claim 1 where the fastening means comprises a bolt, a securing means adapted to engage the bolt and a bushing, the bolt further comprising a head configured to remain entirely within plane formed by the back side of the trolley wheel and the bushing further comprising a crown and a spacer portion.

21. The system of claim 20 where the securing means is a self-securing nut.

22. The system of claim 20 where the bolt head is less than 1/8 of an inch thick

23. The system of claim 20 where the bolt and the securing means are manufactured from stainless steel or carbon steel and the bushing is manufactured from ultra-high molecular weight, polypropylene, polyethylene, Teflon or Delrin.

24. The system of claim 20 where the bolt and securing means are manufactured from carbon steel impregnated with silicon nitride and surface hardened to about 75 Rockwell and the bushing is manufactured from an acetyl homo-polymer of Delrin.

25. The system of claim 20 where the crown is configured to engage the bearing assembly to allow self-adjustment of the trolley wheel and the spacer portion is configured to prevent the trolley bracket from impacting the trolley wheel.

26. The system of claim 25 where the length of the spacer portion is from about 8 millimeters to about 12 millimeters.

27. The system of claim 20 where the bushing is filled with a glass fiber to resist compression.

28. The system of claim 20 where the head of the bolt is secured against the inner race of the ball bearing assembly such that the inner race does not rotate about a perpendicular axis of the bolt and the bushing is secured against the inner race of the ball bearing assembly opposite the head.

29. The system of claim 1 where each link comprises a pair of split halves, the split halves secured together and to the central member by a fastening means.

30. The system of claim 29 where the links, the central member and the fastening means are surface hardened to about 75 Rockwell.

31. The system of claim 29 where the links, the central member and the fastening means are impregnated with silicon nitride.

32. The system of claim 29 where the links, the central member and the fastening means are surface hardened to about 75 Rockwell and impregnated with silicon nitride.

33. The system of claim 1 where the conveyor chain is lapped to remove rough edges.

34. The system of claim 1 where the conveyor chain is manufactured from material selected from the group consisting of cold haul quality steel and microalloy steel.

35. The system of claim 1 where the conveyor chain has a chain pitch of about 76.5 millimeters.

36. The system of claim 32 where the conveyor chain is resistant to changes in chain pitch.

37. The system of claim 1 where the tooth segments are manufactured from a capillary polymer material impregnated with an FDA approved lubricant.

38. The system of claim 37 where the FDA approved lubricant is selected from the group consisting of H1 oil and H2 oil.

39. The system of claim 37 where the tooth segments engage the cavity of the links and provide constant lubrication to the conveyor chain.

40. The system of claim 39 where the tooth segments further comprises at least one tooth.

41. The system of claim 39 where the tooth segments further comprises two individual teeth.

42. The system of claim 41 where the individual teeth have a rounded periphery.

43. The system of claim 41 where the individual teeth have an angular periphery.

44. The system of claim 37 where the turn wheel assembly further comprises a groove to receive the plurality of tooth segments, the groove comprising an internal arc and the plurality of tooth segments is secured in the turn wheel assembly by a securing means.

45. The system of claim 44 where the securing means exerts an outward clamping pressure on the plurality of tooth segments.

46. The system of claim 36 where the trolley wheel assemblies are placed on 12 inch centers.

47. The system of claim 36 where the trolley wheel assemblies are placed on 6 inch centers.